



BENCHMARKS

The University of North Texas Computing Center Newsletter

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A Little of This, A Little of That

By Claudia Lynch, *Benchmarks* Editor (BITNET: AS04@UNTVM1)

This issue of *Benchmarks* doesn't have a specific theme. Rather it is a potpourri of items that have come up in the last several weeks. You will notice that Operation Desert Storm has left its mark in *Benchmarks*, as it has, I am sure, in all of your lives.

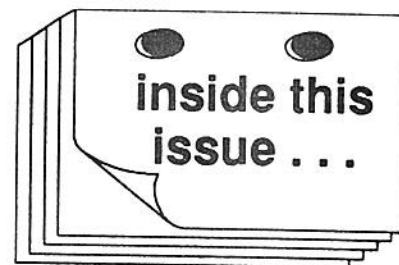
Please note the article on page 3, about the new metro lines. There are some features associated with the new lines that are not present on the old ones. If you are in a situation that requires you to use the metro lines, try the new ones. We think you will be pleased with their performance.

This issue has a lot of information about Wide Area Networks, since "connectivity" is the hallmark of the '90s. Eric Lipscomb, a frequent *Benchmarks* contributor, has supplied us with a comprehensive overview of USENET (see page 3). If you ever access ANU News on the VAXcluster or use *rm* on the Sequent, this article should be of interest to you.

The third article in our series on IBM JCL is located on page 14. The article this month discusses concatenated data sets.

We continue our virus coverage, in the "Microcomputer" section. There is also an informative MicroTip on the DOS CHKDSK command. The ever-popular "Best of the BBS" column is present in the VAX section, and our usual monthly usage statistics are in their appropriate sections.

We hope you enjoy this "non-themed" issue of *Benchmarks*, and continue to look to us for timely information about computing at the University of North Texas and beyond. Happy reading!



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SERVICES AVAILABLE TO USERS OF THE UNT COMPUTING FACILITIES

The UNT Computing Center is located in the Information Sciences Building (ISB), Room 119. Phone Numbers:

Computing Center: (817) 565-2324
HelpDesk: (817) 565-4050
Micro Support: (817) 565-2316, 565-2319
Graphics Lab: (817) 565-3479
ISB I/O Area: (817) 565-3890
BA I/O Area: (817) 565-2350

All personnel listed below can be contacted either by calling the Computing Center or by sending them electronic mail on MUSIC/SP (ID-codes follow each name. All IDs are on BITNET node UNTMUSIC).

Benchmarks - Claudia Lynch (AS04)

Information & ID-Codes; Disk Space Problems - Theresa Russell

Statistical/Research Support - George Morrow (AS01), Panu Sittiwong (AC09), Phanit Laosirirat (AC44)

Academic ADABAS/COM-LETE - Cathy Hardy (AC55)

CRSP & COMPUSTAT Problems - Panu Sittiwong (AC09), Phanit Laosirirat (AC44)

Student Programming Problems - CSCI Dept., GAB Room 550; BCIS Dept., BA Room 152

Problems with JCL, Passwords, or Operating Systems; or Communication/Terminal Problems - Help Desk

Data Entry; Test Scoring & Analysis - Betty Grise

Administrative Applications - Coy Hoggard

Printout Retrieval - ISB or BA I/O Operators



DIALING-UP UNT COMPUTERS OVER THE TELEPHONE

Phone numbers for the Local Area Network (LAN) are:

300 - 2400 BAUD: (817) 565-3300
 300/1200 BAUD: (817) 565-3499
 300 - 9600 BAUD: (817) 565-3461
 300 - 9600 BAUD: D/FW METRO 429-6006, 429-9314

Area code 214 must dial 817 before the METRO #.

The numbers that accommodate multiple baud rates have an autobaud feature that requires you, once connection with the remote modem is made, to hit the <RETURN> key repeatedly so that the receiving modem can determine the appropriate baud rate. When you have established a communications link, the # prompt will appear on your screen and you can enter one of following CALL commands to connect with the computer of your choice.

CALL 8040 connects with the HDS/8083 (supports line editing or PCWS). Operating environments available are: MUSIC/SP.

CALL 3270 connects with the HDS/8083 through a 3270 protocol converter (supports full-screen editing). Operating environments are: MUSIC/SP, VM/CMS, ADABAS/COM-LETE

CALL DEC connects with the VAXcluster (VMS)

CALL 780 connects with the Sequent (Unix)

CALL 3000 connects with the Libraries' HP-3000 (Bibliographic database).

Communications Settings

LAN addresses	Data Bits	Parity	Stop Bits
DEC, 3000	8	N	1
8040, 3270, 780, 6800	7	S	1

HOURS FOR UNIVERSITY OF NORTH TEXAS COMPUTER ACCESS AREAS : Spring 1991*

Location	Days	Times
Computing Center RJE	Sunday Monday-Saturday	Noon-Midnight 7 a.m. Mon.-Midnight Sat. (Open 24 hours/day)
ISB 110 Terminal Area	Sunday Monday-Thursday Friday Saturday	1 - 11:50 p.m. 8:00 a.m. - 11:50 8:00 a.m. - 8:50 p.m. 9 a.m. - 8:50 p.m.
College of Business	Sunday Monday-Thursday Friday, Saturday	Noon - Midnight 8:15 a.m. - 11:45 p.m. 8:15 a.m. - 7:45 p.m.
GAB 550	Sunday Monday-Thursday Friday Saturday	2 p.m. - Midnight 8 a.m. - Midnight 8 a.m. - 3 p.m. CLOSED
Graphics Lab	Sunday Monday-Thursday Friday Saturday	1 p.m. - Midnight 8 a.m. - Midnight 8 a.m. - 9 p.m. 9 a.m. - 9 p.m.
Willis Library	Sunday Monday-Thursday Friday Saturday	1 p.m. - Midnight 7:30 a.m. - Midnight 7:30 a.m. - 9 p.m. 9 a.m. - 9 p.m.

*Hours may vary. Check MUSIC/VAX News and/or posted schedules for exceptions.

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The New Metro Lines Are Here !

The new metro lines are now available. The existing TCOM metro lines will continue to be available during an appropriate turnover period. With this new service, however, comes a slightly different interface. Here are two tables listing all the significant differences between the old and the new metro lines:

Characteristic	The Old Metro Lines	The New Metro Lines
Actual location	TCOM	UT Arlington
Phone Number	(817) 429-6006 (817)429-9314	(817)792-4140
Number of rings before answer	1	3
Highest baud rate supported	2400 baud, or 9600 baud with HST Modems	2400 baud (MNP Class 5 available)
Lowest baud rate supported	300 baud	
Prompt	#	UNTMdems>
Communications settings	Just about anything	7 bit word length SPACE parity 1 stop bit FULL duplex
Flow Control Characters	XOFF / XON (<CTRL> <S> and <CTRL> <Q>)	
Command Characters	<ESCAPE><RETURN>	<CTRL>^ (control-"hat" ¹)
Help Command	HELP	?
How to force a disconnect from host session	Command character followed by DONE <RETURN><RETURN>	Command character followed by DISCONNECT <RETURN>
Who to call for help	Call (817) 565-2324. Place a trouble call. (non-emergency calls placed after hours will be handled the next working day)	

¹The <CTRL>^ character can be typed on most personal computers by either pressing the <CTRL> key and the <6> key at the same time, or by pressing the <CTRL> <SHIFT> and <6> keys all at the same time.

Continued on page 4.

USENET: An Overview

By Eric Lipscomb, Student Network Assistant Manager for the School of Community Service (BITNET: LIPS@UNTVAX)

Many UNT computer users are familiar with USENET, although they may not realize it. USENET newsgroups are accessible on the VAXcluster via ANU News. Computer Sciences students can access USENET newsgroups via the rn command on the Sequent.

The question "What is USENET?" is analogous to a query posed by Lucretius nearly 20 centuries ago: "What is the nature of the Universe?" For indeed USENET is as vast and varied as the Universe, and though we cannot grasp it in its entirety, we can identify and describe enough of it to fool ourselves into thinking that we understand it. But this minute understanding is sufficient for us to use USENET to our advantage. Whether we look for information or entertainment, USENET guarantees to both satisfy and boggle our minds. The remainder of this article attempts to provide the reader with enough background on USENET that he or she may attain a sufficient understanding to venture safely into this "mystical" realm.

USENET, in its basest sense, is a network of computer systems that exchange information among themselves. Unlike other networks, such as BITNET, MILNET, SPAN, or EUnet, to name a few, USENET provides much more than simple communication between computer sites. Instead, most people recognize USENET as its Newsgroups. These newsgroups provide

Continued on page 4.

Commands to Reach UNT Computer Systems From the Metro Dialup Lines

In all the following cases, the CALL or CONNECT command may be substituted with a C followed by a space.

All commands may be typed in either UPPER or lower case.

System	Old Command for TCOM lines	New Command for UTA lines
Academic Mainframe, Full Screen (MUSIC, CMS, Academic COM-LETE)	CALL 3270	Connect VM3270 or Connect CMS or Connect MUSIC
Academic Mainframe, Line Mode	CALL 8040	n/a
VAX Cluster	CALL DEC	Connect VAX or Connect DEC or Connect VAXB
Sequent (Ponder)	CALL 780	Connect Ponder or Connect Sequent
On-Line Card Catalog	CALL 3000	Connect Library or Connect Lib
Solo	CALL 386	Connect Solo
Any TCP/IP Host at The University of North Texas	n/a	Connect <i>ip address</i> or Connect <i>domain name</i>

Back in April of 1990 we told you about the new Metro service that was down the road, and assured you that it would be worth the wait. We're confident that this new system will meet the needs of commuting UNT students and TCOM users for years to come. Once the new metro lines have been fine tuned and exhibit stable performance over a significant period of time, the older TCOM dialups will be phased out. Users who switch to the new dialups now, however, will be richly rewarded. ■

USENET continued from page 3.

several megabytes of widely varied information in the form of messages or articles to all systems connected to USENET daily. Users contribute messages to USENET of great or trivial importance, of serious or humorous intent, and of overbearing or minute size. Other users have access to these articles and may peruse them at their convenience, all without any "official" supervision. But to begin to really understand USENET, we should start at its origin.

The Origins of USENET

USENET began as a UNIX communications project at Duke University in the spring of 1980. Students at Duke and the University of North Carolina wrote software that would exchange specialized messages between their schools' UNIX systems. Shortly thereafter, this software was shared with Usenix (a UNIX users' group), and within a year of the first testing, fifty universities were exchanging messages. Because of the nature of the system and its origins, the early topics of discussion were mostly computer-related emphasizing UNIX topics.

The UNIX operating system began to catch on in the early 1980s, and more and more schools and businesses began to establish UNIX sites on other existing networks. As more sites came online, these sites began to learn about and use this communication software. By 1983, the number of sites supporting the software grew from 50 to 500, with an average of five to ten new sites connecting each month. Employees at Bell Labs became interested in the communication activity and took over writing the communications software, which had become known as the "news" software. Both the user interface (the News reader) and the transport package (the News sender) became standardized and more robust, and the popularity of Usenix News

Today, USENET spans the entire world, though its highest concentration is in the United States. There are approximately 16,000 sites providing access for over 580,000 users at present.

grew. The term USENET soon came into existence to identify the Usenix Network that was spreading across the continent at a rapid pace.

Today, USENET spans the entire world, though its highest concentration is in the United States. There are approximately 16,000 sites providing access for over 580,000 users at present. The News software has undergone major revisions, communications between systems have improved greatly, and the number of Newsgroups has grown from around 100 in 1983 to well over 600 in 1990. Needless to say, the topics of discussion have changed from mostly computer or UNIX discussions to conversations concerning any topic under (and about) the sun. The processes governing USENET have become standardized¹ so that News can be taken to platforms other than UNIX, which is helping to increase both the size and popularity of USENET. Though large and seemingly unstable, USENET grows and will continue to grow in the coming years.

News Delivery

News is still carried today as it was in the beginning: via phone modem. The early versions of the News software

¹ The carrier of these definitions is the Request for Comment [RFC] document. These documents are a basis of standardization used by the Internet that USENET has adopted in its quest to become more like the Internet. Several RFCs were used to obtain information contained in this article. For a good explanation of RFCs, consult Ed Krol's "Hitchhikers Guide to the Internet," included in the list of references.

allowed systems to make contacts with other sites by dialing their numbers directly. The site placing the call absorbed the cost of the transfer, either incoming, outgoing, or both. Even though the amount of traffic was significantly smaller then, 300 and 1200 baud modems were the only ones available, and the transfers could be very expensive.

Even today, the bulk of mail transfers in the Net takes place over 1200 baud connections. But USENET has taken advantage of communications technology along the way. A bulk of the communication path now takes place via

mail carriers that handle the USENET messages, since each message can be seen as a specialized mail message. Many USENET interfaces have been written for different OS platforms to be compatible with uucp, to make the transition between systems smoother. For instance, a VMS machine might contact a News feeder using uucp to get its batch of mail, then transfer that News to other non-UNIX sites using Internet or BITNET mail, a faster, more efficient transfer for those machines.

Not all sites receive a full Newsgroup feed, however. It is up to the administrator of a site to decide which groups or group classes the site will pull. Feeds are arranged generally by the administrators of two sites. If a site A requests a feed from site B, site A is limited to the groups that site B is currently receiving. The administrator of A could also request site B to get feeds on groups that site A wants, or site A could get in contact with site C

Now News can be read on VMS, MVS, MS-DOS, and other operating system platforms.

other networks, such as the Internet and BITNET. By using these other communications methods, USENET News has become available to a wider audience. Now News can be read on VMS, MVS, MS-DOS, and other operating system platforms. This extended communication relies on the standards set forth in the RFC documents concerning USENET.

The early versions of the software made exclusive use of the uucp (UNIX-UNIX copy) transfer protocol that was part of the UNIX system software. This method is still used between UNIX sites, but other machines can use different ways to talk to USENET carriers. Some machines have special

for additional news feeds. In any case, sites B and C are obligated not to feed site A any groups that it does not want, nor are they obligated to provide to A any groups that it does want. As with everything else in USENET, it boils down to a matter of convenience on the part of the administrator.

Newsgroup Structure

In the early days of USENET, when traffic was small, articles were shared among systems in no organized manner. All articles were transmitted as they were received, and following a discussion relied heavily on following the subjects. Soon, though, the traffic became great enough that this process

Newsgroup articles range in topic from the relative safety of using city leaves for garden mulch to discussions of the latest movie release to political systems in various parts of the world

was no longer useful. Articles were organized into Newsgroups with a topic, patterned after the Internet mailing list organization. But where Internet mailing lists were structured, Newsgroups were not, and, for the most part, are still not. There are a few accepted practices and general guidelines governing the organization of the newsgroups, but nothing is official. All "organization" is the product of Newsgroup evolution. Still, there are definite areas that can be described.

Newsgroup Names

Since Newsgroup articles range in topic from the relative safety of using city leaves for garden mulch to discussions of the latest movie release to political systems in various parts of the world to the original UNIX discussions, the Newsgroup name attempts to describe with clarity the topics of a particular Newsgroup. For instance, `rec.arts.movies` carries discussions about movies and movie-making, `talk.politics.mideast` carries discussions about Middle Eastern events, and `comp.unix.questions` has participants asking and answering general questions about UNIX.

But there is a method even to this madness. Newsgroups are organized in a fashion similar to the Internet domain structure.² For the Newsgroups distributed worldwide, there are seven

² For a complete description of the Internet domain name structure, see the Computing Center handout "The Internet: an Introduction to the Use of the Internet at the University of North Texas." or "The Hitchhikers Guide to the Internet; RFC1118."

general topic categories: "comp," "sci," "misc," "soc," "talk," "news," and "rec." Each of these categories is broken down into subcategories by topic. The "comp" category is described as "topics of interest to both computer professionals and hobbyists, including topics in computer science, software source, and information on hardware and software systems."³ Discussions of operating systems would fall under the general category of `comp.os`, with specific OS types falling under that, as `comp.os.minix`, `comp.os.vms`, and `comp.os.msdos`. Each category can have a subcategory, and while this can go to extremes, it does help to clarify the topic. For instance, `comp.os.msdos` has three subcategories: `comp.os.msdos.apps`, `comp.os.msdos.misc`, and `comp.os.msdos.programmer`. Other categories follow the same pattern. The "rec" category is described as "groups oriented toward hobbies and recreational activities"⁴ and has subgroups for discussions on musical topics in `rec.music.beatles`, `rec.music.dementia`, and `rec.music.synth`.

Other Categories

There are several categories in addition to the seven mentioned above that do not receive worldwide distribution, have geographical or regional interest only, or have "nontraditional" topics. These categories include "alt,"

³ Spafford, Gene. "List of Active Newsgroups." `news.lists`, no. <12402@medusa.cs.purdue.edu>, USENET, November 8, 1990, p. 1.

⁴ Ibid.

"bionet," "biz," "clarinet," "gnu," "inet," "pubnet," "unix-pc," "u3b," and "vmsnet." Of these alternative categories, the alt group has the largest following. Some sites include the alt groups as part of the complete feed of newsgroups. Other sites refuse to carry the alt groups. The alt groups have little topic organization, though the group naming does follow that of the major categories.

Whereas the major categories are somewhat predictable as to their topic content, the alt groups have just about anything. Here are a few samples:

<code>alt.aquaria</code>	The aquarium & related as a hobby.
<code>alt.bbs</code>	Computer BBS systems & software.
<code>alt.dreams</code>	What do they mean?
<code>alt.models</code>	Model building, design, etc.
<code>alt.rap-gdead</code>	Fans of The Grateful Dead and Rap. Really.
<code>alt.rhode_island</code>	Discussion of the great little state.
<code>alt.sex</code>	Postings of a prurient nature.
<code>alt.sex.pictures</code>	Lewd pictures consuming net mega-bandwidth.
<code>alt.tv.twin-peaks</code>	Discussion about the popular (and unusual) TV show. ⁵

Groups in Moderation

Another classification that applies to all Newsgroup categories is **Moderated** status. A moderated Newsgroup has specific posting restrictions. Unlike an unmoderated group where any and everyone can post directly to the group,

⁵ Spafford, Gene. "Alternative Newsgroup Hierarchies." `news.lists`, no. <12403@medusa.cs.purdue.edu>, USENET, November 8, 1990, pp. 2-3.

users must submit postings to the moderator of a moderated group. If the moderator approves the post, he or she will post it to the group. This can control the content of the Newsgroup to such a degree that the Newsgroup name indicates exactly what messages it contains.

In unmoderated groups, there is a tendency among users to stray off the topic or to get into large "flame wars" where users criticize each other or other items or people. These types of non-topic messages tend to scare off the user new to USENET, but eventually tempers will die down and discussions will return to "normal." Moderated groups, however, avoid this problem (if it is actually a problem) altogether. Very few off-topic or "flame" articles get sent to the moderator of a group "since the mere knowledge that a posting will be reviewed and judged usually freezes frivolous users in their tracks."⁶

Newsgroup Management

One of the joys and curses of USENET is the lack of management of the Newsgroups. At the same time, this state of organized anarchy provides a great deal of freedom and a healthy dose of chaos to the participants. This is one of the things that makes USENET so popular.

What little control there is over USENET exists in the form of the RFCs. These documents detail specific standards that must be followed for the machine to work. But the RFCs only dictate over the format of the articles, the protocols used to deliver News, and the creation and removal of groups. Even in the case of the latter, these standards are really only guidelines that can be followed if full cooperation is needed.

⁶ Nemeth, Evi, Garth Snyder, and Scott Seebass. *UNIX System Administration Handbook*. Prentice Hall, Englewood Cliffs, New Jersey, 1989, p. 369.

Moderated Newsgroups (again)

One such form of management is the concept of the moderated newsgroup. A repeat of the format of these Newsgroups is not necessary, but it is essential to point out that all sites getting feeds on a moderated group must agree to follow the rules of moderation. When the administrator sets up the feed for the moderated group, he or she must make sure to disable a user's ability to post directly to the group. Instead, an option to send an article directly to the moderator instead of the group could be put in place. If a site refuses to follow this restriction, the sites feeding it will be asked not to provide feeds for that particular group, and the site will be cut off from that group, if not from USENET altogether.

Creating a New Group

Looking at the list of newsgroups might lead one to believe that there is no policy on creating new groups, when, in actuality, that is not the case. The procedure for creating a new group is outlined in detail in Eliot Lear's "How to Create a New Newsgroup." The process is quite time-consuming and leaves many places for new group creation to fail.

The process begins with a "call for discussion" that is posted on news.announce.newgroups and to any other groups related to the proposed new group. During the discussion period a charter for the new group is created and moderators, if any, for the group are named. The discussion lasts for a 30 day period. If no general agreement is reached during that time, the discussion may be continued in private mail until such point that problems have been resolved, at which time another call for discussion is posted including the revised information. If an agreement is reached within the 30 day period, a call for votes is posted.

The "call for votes" is posted on news.announce.newgroups and any groups on which the call for discussion was posted. This should occur as soon after the end of the discussion period as possible. The call for votes must explicitly outline the voting procedure: where to send votes and the length of the voting period. It must not be more or less difficult to cast a particular vote over the other, and the voting period must last between 21 and 31 days. During the voting period, no discussion of how the voting results may be posted. Additional calls for votes may be posted including the IDs of those who have voted, but not how they voted. The charter for the new group may not change in any way during the voting period. Only votes mailed to the vote-taker are valid. No group votes, voting by proxy, or voting under multiple IDs are allowed.

After the voting period has ended, the vote-taker must post the results of the vote, including the IDs of all who voted and which vote they cast. This post is available for five days to make corrections in case of error. If the number of "yes" votes outnumbers the number of "no" votes by at least 100, and there is a two-thirds majority of "yes" votes, the new group is created. The vote-taker is then responsible for notifying the keeper of the master Newsgroup list of the new group and its pertinent information.

This process does not guarantee the creation of the new group, however. Currently, there is a discussion in news.admin concerning a call for discussion and votes to create a new group that was done according to the "rules," but one of the individuals responsible for verifying the process has remained silent on the issue, and the group has yet to be created. No matter what the outcome of this particular incident, there is almost a guarantee of a new policy concerning group creation being released to the net.

References

- Emerson, Sandra L. "USENET: A bulletin board for UNIX users." *Byte* (October 1983), 219-236.
- Frey, Donnalyne, and Rick Adams. *!%@:: A Directory of Electronic Mail*. O'Reilly & Associates, Sebastapol, California, 1990.
- Horton, Mark R. "Standard for interchange of USENET messages; RFC850." In *ARPANET Working Group Requests for Comments*, no. 850. SRI International, Menlo Park, Calif., June 1983.
- Horvitz, Robert. "The USENET Underground." *Whole Earth Review* (Winter 1989), 112-115.
- Kelly, Kevin. Introduction to "The USENET Underground." *Whole Earth Review* (Winter 1989), 112.
- Krol, Ed. "The Hitchhikers Guide to the Internet; RFC 1118." In *ARPANET Working Group Requests for Comments*, no. 1118. SRI International, Menlo Park, Calif., September 1989.
- Lear, Eliot. "How to Create a New Newsgroup." *news.admin*, no. <12395@medusa.cs.purdue.edu>, USENET, November 8, 1990.
- Nemeth, Evi, Garth Snyder, and Scott Seebass. *UNIX System Administration Handbook*. Prentice Hall, Englewood Cliffs, New Jersey, 1989.
- Quartermann, John and Josiah Hoshins. "Notable Computer Networks." *Communications of the ACM* 29, 10 (October 1986), 932-971.
- Spafford, Gene. "Alternative Newsgroup Hierarchies." *news.lists*, no. <12403@medusa.cs.purdue.edu>, USENET, November 8, 1990.
- "How to Construct the Mailpaths File." *news.admin*, no. <12404@medusa.cs.purdue.edu>, USENET, November 8, 1990.
- "List of Active Newsgroups." *news.lists*, no. <12402@medusa.cs.purdue.edu>, USENET, November 8, 1990.
- "List of Moderators." *news.lists*, no. <12406@medusa.cs.purdue.edu>, USENET, November 8, 1990.
- "The Internet: an Introduction to the Use of the Internet at the University of North Texas." Academic Computing Services, University of North Texas, Denton, Texas, August 1990.
- "USENET." *Horticulture* (October 1988), 11-12.

Never Underestimate the Power of the People

The January 1991 issue of *Benchmarks* contained an article about a new product called *Household Marketplace* that Lotus Development Corp. was scheduled to release in March, 1991. The public response to this product has been less than enthusiastic. In fact, it has been down right negative. So negative, that Lotus has decided to scrap the product.

According to a posting to the Usenet group comp.dcom.telecom, Lotus decided to discontinue the product after receiving thirty thousand complaints against *Household Marketplace*. An article in the San Jose, California *Mercury* was quoted as saying "Much of the criticism [of the product] came from sophisticated computer users on the nationwide Usenet computer network, who began a grass-roots campaign against the product that spread quickly." ■

U.S. Supreme Court Decisions Available On-line

Taken from an article that appeared in the November 1990 issue of Buffer, The Newsjournal of Computing at the University of Denver.

On May 11, 1990, the United States Supreme Court announced that it was beginning a two-year experimental program called "Project Hermes."

Twenty organizations applied to be a part of this project, 12 were accepted; and one of the successful applicants was a non-commercial, non-profit consortium composed of Case Western Reserve University (CWRU), EDUCOM, and the National Public Telecomputing Network (NPTN). What this means for YOU is that you will now be able to receive electronically the full text of the Court's opinions within minutes of their release — FREE.

The Way it Works . . .

When the Court decides to release an opinion or set of opinions, a computer at the Supreme Court Building will open-up 12 telephone lines and simultaneously send copies to its primary distributors.

A special program will clear out the various printer codes from the document. Two things will then occur.

First, a copy of each of the "clean" documents will be sent electronically to the EDUCOM offices in Washington D.C. EDUCOM will then place the files on both the Internet and BITNET networks for distribution to the academic and research community.

Second, and at the same time, copies will be distributed accross all NPTN affiliated community computer systems.

You may have the Court's opinions sent directly to you if you have access to either BITNET or the Internet, or you may download the files directly from any NPTN community computer system.

The U.S. Supreme Court opinions are immediately available from Case Western Reserve University via "Anonymous" FTP over the Internet from host `ftp.cwru.edu`. The files relating to the opinions are located in the directory "hermes." [If you have questions about FTP, consult the hand-out "The Internet: An Introduction to the Use of the Internet at the University of North Texas," available from the Computing Center (ISB 119).]

This directory contains several readme files and two subdirectories: `ascii` and `atex`. The "atex" subdirectory contains the files as directly received from the U.S. Supreme Court in the Atex 8000 Document Processing and Typesetting system format. These files contain 8-bit typesetting codes and are extremely difficult to read on a typical display. Those wishing to copy the Atex files should make sure they set "image" mode on FTP.

The "ascii" subdirectory contains the same files as processed by a locally developed filtering program designed to remove the typesetting codes while retaining as much of the "look" of the document as possible. These files are in plain ASCII text.

Each opinion consists of an optional syllabus, the opinion and optionally concurring and dissenting opinions. Each is contained in a separate file. A syllabus is associated with most of the opinions and summarizes the ruling.

The filter program, which removes the typesetting codes, moves footnotes to the end of the document separated with a dashed line. Footnote references are enclosed in curly brackets "{ }." Most of the features of the typeset document, such as bolding, italicizing, use of fonts, and other similar characteristics

NETLIB Addendum

By Claudia Lynch, *Benchmarks* Editor (BITNET: AS04@UNTVM1)

According to an article in the December 1990 issue of the University of Minnesota Academic Computing Services Newsletter, ACS, some additions have been made to NETLIB. NETLIB is an electronic mail system for distributing public domain mathematical software. It was first introduced to readers of *Benchmarks* in the November/December 1990 issue, which focused on statistical packages. A thorough description of NETLIB is contained in the article "NETLIB Public Domain Mathematical Software," on pages 16-19 of that issue.

NETLIB can be accessed by sending requests in the form of electronic mail addressed to: `NETLIB@ORN.L.GOV`

The following items have been added to the list of libraries in NETLIB.

ParaGraph	Graphical display system for visualizing behavior of parallel algorithms on message-passing multi-processors.
vfftpr	Vectorized Fortran subprograms for fast Fourier transform of multiple read sequences.
FORTTRAN	Fortran single-double precision converter.
TYPESETTING	troff and LaTeX macros: AMS-TeX macros.
C++	Miscellaneous C++ codes.
OPT	Miscellaneous optimization software.
BIB	Bibliographies: Golub and VanLoan. Matrix Computations. 2nd ed.

You can get a list of routines from these libraries by sending a mail message to the address listed above with the text **SEND INDEX FROM *library***, where *library* is the name of the library you are interested in. You can get a particular routine from a library by the same process, except the text of your message would say **SEND routine FROM *library***. Again, *library* is the name of the particular library you are interested in and *routine* is the name of a particular routine. ■

are lost in the translation to ASCII. The resulting filtered documents, however, are quite readable on most displays.

To receive more information on how to sign-up for the BITNET/Internet service, or if you would like to know more about accessing these files on an NPTN community computer, please send your name, organization or firm, address, city, state, and zip to:

Project Hermes, CWRU
Community Telecomputing Lab

319 Wickenden Building,
Cleveland, Ohio 44106.

For general information about Project Hermes or about the National Public Telecomputing Network, please contact: Tom Grundner at the above address or at (216) 368-2733.

You can also contact Project Hermes electronically by sending mail to `aa586@cleveland.freenet.edu`. Report any problems to the id `aa584@po.cwru.edu`. ■

Desert Storm E-mail

This message has been posted to various newsgroups on the Internet and BITNET. It was originally posted in December, pre-Desert Storm. The information is still valid, as far as we know. — ed.

A drop-box address has been established at **saudi-connection@Ra.MsState.Edu** to route personal messages to U.S. military personnel involved in Operation Desert Shield.

Since there is presently no known direct internet route to Saudi Arabia, these messages will be uploaded to the Saudi Connection, a BBS network. Traffic on the Saudi Connection ends up with a sysop in Saudi Arabia who prints the messages on a laser printer and delivers them to the U.S. military postal system there.

Although the routing is very complex, these messages are now being delivered to the addressee in Saudi Arabia in less than a week. In comparison, there have been reports that snail-mail is taking six to 10 weeks.

While the contents of these messages are not available for public viewing, they are also not private. One or more sysops in the system will censor the messages for racial slurs, profanity and obvious things of that nature. The Saudi Connection is a private endeavor and those involved in it feel strongly that it should only be used to send "positive" messages. No message will be passed which might adversely affect the morale of the recipient.

This is presently a one-way deal. No system has been established for return mail, so be sure to include your snail-mail address, especially if you are writing to ANY SERVICE PERSON.

Include the service person's name and address in the body of your message as

Continued on page 10

THE BITNET CONNECTION

By Dr. Philip Baczewski, BITNET INFOREP (BITNET: AC12@UNTVM1)

This Column is a continuing feature of Benchmarks intended to present news and information on various aspects of the BITNET wide area network.

BITNET, Your Gateway to the World

When you say "BITNET," you may be saying more than you realize. Technically, BITNET is the RSCS-based network administered by CREN¹ and providing services to U.S. Colleges and Universities. BITNET, in the more generic sense, extends far beyond the United States, however, with cooperating networks world wide in a total of 45 countries. This extends the BITNET RSCS network with direct connections to networks in Canada, Mexico, Europe, Asia, Africa, and South America. BITNET RSCS connectivity now includes about 630 member institutions encompassing over 3300 nodes, but the connectivity² does not stop there. By using BITNET, you can access a number of additional computer networks via mail gateways.

Gateways are nodes which are connected to two or more networks. They usually run special software to translate mail files from the format needed for one network to that needed for a second, and then proceed to send the mail message to the specified user of that second network. BITNET users have a number of gateways of which to take advantage, most of the time without needing to know anything about the gateway itself. On the VM/CMS system, a *Domain Names* table is used to define various networks and the associated gateways for sending mail and a similar routing system is used on the VAX VMS system.³ Therefore, if a "non-BITNET" network is defined in the Domain Names table, you only need to specify the destination address on the other network and the mailer program will route it to the appropriate gateway.

Probably the most actively used gateway from BITNET is the one to the Internet, the collection of commercial and research networks accessible to UNT via membership in the National Science Foundation's NSFNET. There are actually a number of gateways to the Internet from BITNET, but the one which serves mail coming from UNT is at Rice University. So if you are a BITNET user and you want to send a message to someone on the Internet, all you need to know is their Internet address (well, you also need to know how to specify that address in the mail program, but more about that later).

Internet addresses as well as those for many other networks are a bit different than BITNET address. On BITNET, we are used to user-id and node specifications which do not exceed eight characters and are combined using the format **user-id@node**.

¹ Corporation for Research and Educational Networking.

² There was a time when the word connectivity was relatively obscure, but with the advent of computer networking it's become an obligatory usage when writing about computing. This can be handy to remember when talking to computer sales people: just say "well, what about connectivity?" and they'll have to be impressed with your computing knowledge.

³ NOTE: because of limitations in implementing mail software on the MUSIC/SP system, gateway mail cannot be sent from that host.

General Information

Internet addresses also use this format, but the user-id portion may exceed eight characters and the node specification is a hierarchical designation that almost always exceeds eight characters. At the top of this hierarchy are six primary U.S. domains:

COM	commercial organizations
EDU	educational organizations
GOV	civilian government organizations
MIL	Department of Defense
NET	administrative organizations for networks
ORG	other organizations

The second level of the address specification usually indicates the institution, the next might be a department, and the lowest level of the address specification might be an individual computer. For Internet addresses, these domains are connected by periods (.) from lowest first, to highest last. UNT, for example, falls into the EDU domain and the Internet address of the VAX VMS system is VAXB.ACS.UNT.EDU.⁴

All six of the above top-level domains are defined in the BITNET Domain Names table. If an address to one of those domains is specified, the mail will automatically be routed to the closest gateway to the Internet. Some other network domains known to BITNET include:

HEPNET	High Energy Physics Network/SPAN
HK	Hong Kong Academic and research Network
JP	Japanese National Network
MFENET	Magnetic Fusion Energy Network
UK	United Kingdom University/Research Network (Janet)
UUCP	International network based on the Unix-to-Unix Copy Program
YUNAC	Yugoslav Network for the Academic Community

In addition to the above are the Internet domains or national networks for many countries, usually designated using each country's two-letter ISO code.

⁴ None of the Academic IBM mainframe systems (MUSIC, CMS, MVS) have Internet addresses, since the HDS is not yet connected to the Internet.

LIST of the Month

Each month we will highlight one of the BITNET LISTSERV Special Interest Group (SIG) mailing lists. This month's list...

DESERT-L@PCCVM

Coordinator: SYSMAINT@PCCVM (Russell N. Hathhorn)

This list carries an open discussion forum on Operation Desert Storm. Topics vary from political ramifications to environmental impact of this war.

No one can avoid being affected by the current war in the middle east. This BITNET mailing list allows a free exchange of ideas and information on this topic. To subscribe, send the following command via an interactive message to LISTSERV@PCCVM:

SUB DESERT-L your full name

If you know one of these "gatewayed" addresses, the next step is to specify that address within the mail program that you are using. On the VAX, the address format would be IN% "user-id@node" entered at the "To:" prompt. On CMS, if you use the MAIL program (RICE MAIL v. 90.01) gatewayed addresses are also simple to specify; enter the command MAIL user-id@node or MAIL user-id AT node from the CMS "Ready" prompt. If you wish to define a nickname on CMS for an Internet or other gatewayed address, you will probably need to specify the user-id and node using the "tag" and "value" fields at the bottom of the NAMES program screen.⁵

⁵ For a detailed description of using the VAX mail program or defining gatewayed addresses in the CMS NAMES program, see "The BITNET Connection" (Benchmarks — June, 1990).

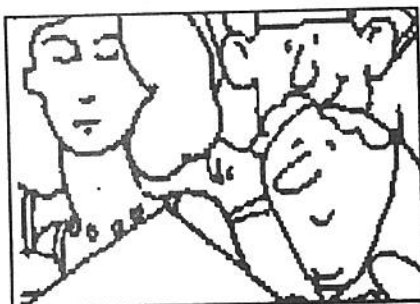
An additional benefit of gateways on BITNET is that they provide access to many commercial networks that have gateways to the Internet. These include some major electronic mail networks and commercial information services. The following lists several of these along with the format for specifying the address.⁶

AT&T Mail	account-name@attmail.com
BIX	user@dcibix.das.net
CompuServe	7xxxx.yyy@compuserve.com
MCI Mail	account-name@mcimail.com or mci-id@mcimail.com ⁷

⁶ A comprehensive list of computer networks and addressing formats can be seen by typing HELP NETWORKS on the VAX.

⁷ The Internet<->MCI Mail Gateway is an experimental mail system being developed by the Corporation for National Research (NRI), a non-profit organization. Currently, there is no charge for sending mail from the Internet to MCI Mail.

Specifying addresses for networks which are not directly attached to BITNET by a gateway can get a bit complex. Usually, however, once a working address format is found, sending the mail is quite easy. In this manner, BITNET can not only allow you to communicate with other universities, but with an expanding world of diverse computer networks as well. ■



BENCHMARKS FORUM

BENCHMARKS FORUM is intended to serve as a vehicle for answering questions that may be of general interest to the user community. If you have a question, please send electronic mail to the Benchmarks editor (BITNET: AS04@UNTVM1) or write it down and drop it by the Computing Center. We will try to answer it in the next issue.

Question: I am having some problems downloading from the VAX with the 7S1 data communication settings. The problem seems to be data dependent. I can download/upload some files, but not others. One of my files, a binary file, breaks it every time. Can you help?

Answer: I agree with your data dependent diagnosis. To totally change all the parameters on the test, I tried it with the latest version of MS-Kermit (released yesterday) frontending TES (novell VAX access method) over the Ethernet using even C-kermit on the VAX. It failed for me too.

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1991 Spring Short Courses

Academic Computing Services
University of North Texas
Computing Center

The Computing Center is offering the following short courses for the remainder of the spring 1991 semester. Please pre-register to attend (a registration form can be found at the end of this issue). A maximum of 10 people will be admitted to each of the courses held in ISB 110 and ISB 235. A maximum of 7 people will be admitted to each of the courses held in the Graphics Lab. A maximum of 8 people will be admitted to each of the courses held in ISB 123.

PLEASE NOTE: Faculty and students have first priority to register for these classes.

MAINFRAME COURSES

- 1. Introduction to MUSIC/SP:** Introductory sessions to MUSIC/SP will be held in Room 110 of the Science Library (ISB) on a bi-weekly basis. **NO PRE-REGISTRATION IS REQUIRED FOR THESE COURSES.** Consult the HELP DESK (565-4050) for a schedule of classes and/or to request a class on a specific day. All courses will be taught by Help Desk staff.
- 2. Introduction to IBM Job Control Language:**
A separate two-hour session to be held in the Academic Computing Conference Room (ISB 123):
 - Monday, February 25: 5:30-7:30 p.m.
Instructor: Cathy Hardy
- 3. Introduction to SAS:**
A three-hour session to be held in the Science Library (ISB 110):
 - Tuesday, February 12: 1:00-4:00 p.m.
Instructor: Panu Sittiwong
- 4. Introduction to SPSS:**
A three-hour session to be held in the Academic Computing Conference Room (ISB 123):
 - Wednesday, February 13: 1:00-4:00 p.m.
Instructor: Panu Sittiwong

5. Introduction to CMS:

A two-hour session to be held in the Science Library (ISB 110). Additional courses may be scheduled through the HELP Desk, just as with the MUSIC/SP courses:

- Tuesday, February 26:
3:00-5:00 p.m.
Instructor: Philip Baczewski

6. Introduction to the Internet and USENET:

A two-hour session to be held in the Computing Center Conference Room (ISB 235):

- Thursday, February 14:
3:00-5:00 p.m.
Instructor: Billy Barron

7. Introduction to CUTCP/Telnet:

A two-hour session to be held in the Computing Center Conference Room (ISB 235):

- Monday, February 18:
3:00-5:00 p.m.
Instructor: Marc St.-Gil

MICROCOMPUTER COURSES

1. Introduction to Hypercard:

A two and 1/2 hour session to be held in the Graphics Lab (ISB 6):

- Tuesday, February 19:
1:00-3:30 p.m.
Instructor: Pro Systems Staff

2. Introduction to SAS PC:

A three-hour session to be held in the Science Library (ISB 110):

- Wednesday, February 20:
2:00-5:00 p.m.
Instructor: Phanit Laosirirak

3. Introduction to SPSS PC+:

A three-hour session to be held in the Science Library (ISB 110):

- Wednesday, February 27:
2:00-5:00 p.m.
Instructor: Phanit Laosirirak

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The book on MS-Kermit did give me a workaround. Give VAX Kermit the command SET PARITY SPACE before you start downloading. A quote from the book: "The most common cause of file transfer failure is parity. Kermit would prefer not to use parity, but if the host computer or the network between your PC and the host uses it, you must tell Kermit about it; otherwise, the unexpected addition of parity bits to the characters in the Kermit packet will cause Kermit's error checking to fail. Solution: SET PARITY EVEN (or whatever the parity really is). Give this command to *BOTH* Kermit programs." I hope this helps. Billy Barron, VAX/Unix System Manager

The following questions and answers are from the document RFC1177 ("FYI on Questions and Answers to Commonly asked 'New Internet User' Questions") by G. Malkin, A. Marine, and J. Reynolds. It is available via Anonymous FTP on NCI.DDN.MIL

Question: I just got on the Internet. What can I do now?

Answer: You now have access to all the resources you are authorized to use on your own Internet host, on any other Internet host on which you have an account, and on any other Internet host that offers publicly accessible information. The Internet gives you the ability to move information between these hosts via file transfers. Once you are logged into one host, you can use the Internet to open a connection to another, log in, and use its services interactively. In addition, you can send electronic mail to users at any Internet site and to users on many non-Internet sites that are accessible via electronic mail.

There are various other services you can use. For example, some hosts provide access to specialized databases or to archives of information. *The Internet Resource Guide* provides information regarding some of these sites. *The Internet Resource Guide* lists facilities on the Internet that are available to users. Such facilities include

supercomputer centers, library catalogs and specialized data collections. The guide is published by the NSF Network Service Center (NNSC) and is continuously being updated. The Resource Guide is distributed free via e-mail (send a note to resource-guide-request@nnsf.net to join the e-mail distribution) and via anonymous FTP (in nnsf.net:resource-guide/*). Hardcopy is available at a nominal fee (to cover reproduction costs) from the NNSC. Call the NNSC at 617-873-3400 for more information.

Question: How do I find out if a site has a computer on the Internet?

Answer: Three good sources to consult are !%@: A *Directory of Electronic Mail Addressing and Networks* by Donalyn Frey and Rick Adams; *The User's Directory to Computer Networks*, by Tracy LaQuey; and *The Matrix: Computer Networks and Conferencing Systems Worldwide*, by John Quarterman.

In addition, it is possible to find some information about Internet sites in the WHOIS database maintained at the DDN NIC at SRI International. The DDN NIC provides an information retrieval interface to the database that is also called WHOIS. To use this interface, Telnet to NIC.DDN.MIL and type whois (carriage return). No login is necessary. Type help at the whois prompt for more information on using the facility. WHOIS will show many sites, but may not show every site registered with the DDN NIC (simply for reasons having to do with how the program is set up to search the database).

Benchmarks Reader/User feedback is encouraged. Send all letters, suggestions, etc to (AS04@UNTVM), FAX 817-565-4060 or to the Benchmarks Editor at:

Academic Computing Services
University of N. Texas
Computing Center
P.O. Box 13495
Denton, Texas 76203



OS/MVS JCL: Concatenated Data Sets

By Cathy Hardy, Academic Database Consultant (BITNET: AC55@UNTVM1)

This is the third in a series of articles dealing with JCL (job control language). This series is aimed at the current JCL user who would like to have a better understanding of statement use and coding options. If you are not currently a JCL user, but would like to begin learning about JCL, Academic Computing has a free handout available in ISB 119. Stop by and ask for "IBM Job Control Language," or contact an Academic Mainframe Users Support consultant for further information.

In JCL, many input data sets are allowed to be read in sequence as if they were a single file. The resulting file is known as a **concatenated data set**. Concatenating data sets in job streams is used to avoid coding multiple job steps.

Up to 255 sequential or 16 partitioned data sets may be concatenated (logically connected) in a job step. These data sets may reside on different output devices, but the devices must be of the same type. For instance, you may concatenate data sets from different tapes, or data sets residing on different DASD volumes, but you may not concatenate a data set located on DASD with a data set on tape. Data sets should also have the same DCB characteristics (LRECL, RECFM, and BLKSIZE should be the same).

How It's Done

To concatenate data sets, omit the ddnames from all the DD statements **except the first** in the sequence. When the ddname of the first DD statement is encountered, each data set is automatically processed in the order they are coded. For example:

```
//JOB CARD
//STEP1 EXEC IEBGENER
//SYSPRINT DD SYSOUT=A
//SYSIN DD DUMMY
//SYSUT1 DD DSN=USER.XXNN.NAMES,UNIT=SYSDA,
//      VOL=SER=ACAD01,DISP=SHR
//      DD DSN=USER.XXNN.ADDRESSES,UNIT=SYSDA,
//      VOL=SER=ACAD02,DISP=SHR
//      DD DSN=USER.XXNN.PHONE,UNIT=SYSDA,
//      VOL=SER=ACAD03,DISP=SHR
//SYSUT2 DD SYSOUT=A
//
```

(In the above example, each of the data sets have the same LRECL, RECFM, and BLKSIZE.)

Although this may seem obvious, remember: you should not concatenate other data sets to a DUMMY data set. When the program reads a dummy data set, an end-of-data-set is taken immediately and any concatenated data sets are ignored.

Cautions on referencing concatenated data sets

If a backward reference (using an asterisk) or a forward reference (using the DDNAME parameter) is made to a concatenated data set, the system obtains information only from the first data set defined in the sequence.

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shown below:

Specific Individuals:

Name, Rank, Social Security Number

Operation Desert Shield

Organization/Unit (Deployed)
APO NY ZIPCode

Local Forces [THIS MUST BE INCLUDED OR IT WILL GET SENT TO NEW YORK AND THEN BACK TO SAUDI !!!!!]

Any Serviceperson:

Any Servicemember

Operation Desert Shield

APO New York 09848-0006

Local Forces [THIS MUST BE INCLUDED OR IT WILL GET SENT TO NEW YORK AND THEN BACK TO SAUDI!!!!]

It is important that you put "Local Forces" as the last line of the address. If you don't, it will take a very long time, indeed, to reach the addressee. Please try to limit messages to 20 lines. Once again, the drop-box address is: saudi-connection@Ra.MsState.Edu ■

A quick recap of the rules for concatenation

- Do not code a DDname on the second and following DD statements
- Concatenated data sets have identical DCB parameters (LRECL, RECFM, BLKSIZE)
- Concatenated data sets are read and executed in the order they are coded in the job stream.

For additional information on concatenation of data sets, check your IBM JCL manual.

Next issue: Utilities ■



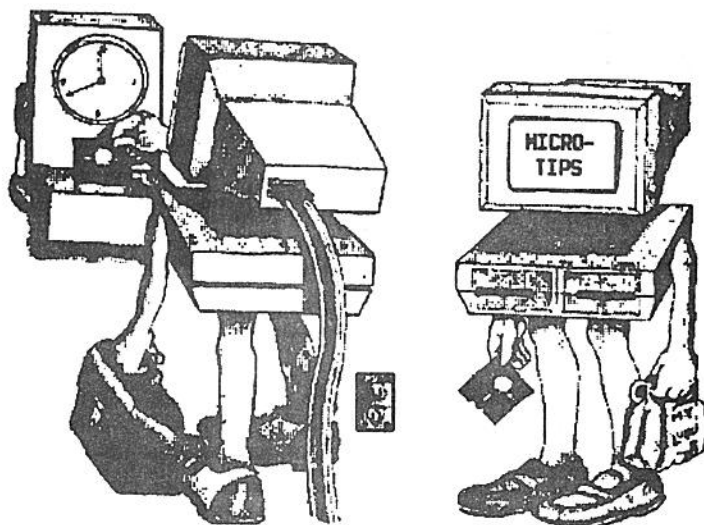
Virus Alert

By Claudia Lynch, *Benchmarks* Editor
(BITNET: AS04@UNTVM1)

The following new viruses/virus conditions have been reported recently.

- A hacked version of Omen Technology's DSZ ZMODEM External File Protocol Module called DSZ1203.ZIP has appeared. The DSZ file inside is infected with a new variant of the Violator virus known as the Christmas Violator or Violator-B4 virus. The virus contains an ASCII message from a group called RABID and contains a Christmas greeting.
- A new virus called 2480, because it adds 2480 bytes to the end of every .COM file it decides to infect, has been found. Files infected with the virus occasionally display the logo of European Crackin' Crew. The virus is not memory resident and can easily be noticed because the European Crackin' Crew's logo is at the end of every infected .COM file.
- A "politically motivated" variant of the Jerusalem (PC) virus has been found. It is called 'grLkDos' or 'Groen Links' and plays a tune associated with the Dutch 'Groen Links' (Green Left) political party.
- Another apparently "politically motivated" virus has been discovered at M.I.T. It is called the BEJING virus ("Bloody" in the United Kingdom). The virus attempts to display the message "Bloody! Jun. 4, 1989" which is the date of the Chinese "Tianamen Square" confrontation between rebelling students and the Chinese Army in Beijing. Due to a bug in the virus, however the actual message may be displayed as garbage characters.

Continued on page 17.



This column is intended to serve as a forum for sharing useful tips on making more productive use of microcomputers. If you have a tip that you feel may be of use to campus users, submit it to the Benchmarks editor for possible inclusion in a future issue.

For More Information Call: CHKDSK

This article appeared in the "Microcomputer Notes..." section of the George State University Computer Center newsletter, The Link (Winter Quarter 1991).

The CHKDSK (Check Disk) command is a DOS utility used to obtain information about your hard disk or floppy disks. It analyzes the directories, files, and the File Allocation Table (FAT) on the default or designated drive. CHKDSK produces a disk and memory status report and displays it to the screen. (NOTE: CHKDSK output may be directed to a disk file. See examples below.) The format for the CHKDSK command is:

`[d:][path]CHKDSK[d:][path][filespec] [/V] [/F]`

where the following is true:

`[d:][path]`

Entered before the command to indicate the drive and path that contains the CHKDSK.COM file. DOS will use the current default drive and path, if any, if one is not specified.

`[d:][path][filespec]`

To specify the drive and file name. If a file name is specified, CHKDSK displays the number of non-contiguous areas occupied by the file or files. The wildcard characters, *, *, when specified in the filespec field will examine the contiguity of the current directory.

`[/V]`

To display all files and their paths on the default of specified drive.

`[/F]`

To fix errors that are found in the directory or file allocation table.

CHKDSK is used to:

- ① examine the directory of the disk and provide disk wide information.
- ② indicate the number of non-contiguous clusters that your files contain.
- ③ identify and possibly correct errors found in the file allocation table or directories.
- ④ provide a complete listing of all subdirectories and files on the default or specified drive.

NOTE: CHKDSK does not work on network drives or those involved in a substitution (SUBST) or JOIN.

Disk Information

Entering the command CHKDSK without any parameters will produce a status report on the disk in the default drive. This report includes the following information:

- Disk volume label (if present).
- Total disk space (in bytes).
- Number of hidden files and space used.
- Number of directories and space used.
- Number of user files and space used.
- Number of bytes written to bad sectors (Note: this is reported only if there is data in bad sectors).
- Available disk space.
- Total memory present.
- Total memory available.

Below is an example of a CHKDSK status report:

```
Volume USGJDO
30314496   bytes total disk space
53248     bytes in hidden files
98304     bytes in 49 directories
10762240  bytes in 660 user files
19400704  bytes available on disk

655360    bytes total memory
550928    bytes free
```

Disk Fragmentation Information

By entering CHKDSK with a file specification, the report will list the name(s) of file(s) containing non-contiguous clusters, i.e., those files that are "fragmented." What does this mean?

Tracks on a disk are divided into sectors. A cluster is a set of continuous

sectors. When a file needs to grow, DOS allocates one cluster of space to that file. If the file needs more, DOS looks at the next cluster to see if it is available. If it is not free, DOS continues its search until it finds one that is. DOS will not allocate a portion of a cluster. So the contents of the file are stored on different locations of the disk. The file is fragmented. This is bound to occur on a busy disk and the only real penalty for having parts of the same file physically located at different areas of the disk is speed of access. When the file's contents are scattered over a disk, the drive's heads must do a lot of extra movement to access the entire file.

CHKDSK allows you to determine the extent of file fragmentation. Entering **CHKDSK *.*** will provide a listing of files for the current or specified directory that are non-contiguous. If you find you have a lot of fragmented files, one solution is to use the DOS COPY command to copy all of your files to a second CLEAN formatted disk [assuming your files are on floppies] by entering **a:COPY *.* b:**. Do not use the DISKCOPY command. DISKCOPY makes an exact copy of the original disk, fragmented files and all. Another way is to use the DOS BACKUP command and then restore the files using the DOS RESTORE command. This method would be more practical if you have a lot of subdirectories or are restoring your hard disk. [Ed. Note: There are also many "utility" programs that will clear up disk fragmentation such as *Norton Utilities* and *PC Tools*. If you have a hard disk, one these would be worth getting for a variety of reasons.]

Disk Directory Listing

The CHKDSK option /V tells CHKDSK to provide a listing of the files it encounters while checking the disk for possible errors. This is a good way to get a complete listing of all subdirectories and files on your hard disk.

Disk Space Allocation Problems

By specifying the option /F (form fix), you can instruct CHKDSK to correct a type of disk allocation problem: Cross-linked or orphaned clusters. Either of these can occur as a result of a defective disk or an incomplete DOS file operation.

For example, if a program begins to create a disk file but is interrupted (the power fails, the drive door is opened), DOS cannot complete the operation. What can happen is that the contents of the file are written and its sectors are identified in the file allocation table (FAT). But the directory shows it as having a length of zero. The file "exists," that is, it occupies disk space, but you can't access it. The cluster is "orphaned." Similar failures can result in two different files acquiring a common cluster identification number in the FAT. These files are cross-linked.

CHKDSK entered without any options will advise you of any abandoned clusters with a message. A sample message follows:

You have 354 lost clusters in 9 chains.

CHKDSK will also ask you if you wish to recover these lost clusters into files. However, without the /F option it will not actually write the data to disk. You must specify the /F parameter and then answer "Y" to tell CHKDSK that you want the lost clusters written to disk. CHKDSK will place each chain into a file with its name in the form:

FILEnnn.CHK

Where nnnn is a sequential number beginning with 0000. These files are created in the root directory of the specified or default drive. If you answer "N" with the /F option, CHKDSK simply erases them. The /F option "fixes" only those disk allocation problems associated with directories and the FAT. It cannot remedy data lost as a result of a bad or damaged are on your disk, e.g. data written to bad sectors. NOTE: Do not redirect

CHKDSK's output to a file when using the /F parameter.

Examples:

The following produces a status report for the disk in drive A.

C>chkdsk a:

The following produces a status report and lists all the files and their paths on drive C and redirects the output to a file on the disk in drive A. You can then print the file. This is helpful if you want to clean up and reorganize when you have a lot of branching subdirectories. Remember, do not use the /F parameter when redirecting CHKDSK output.

C>chkdsk /v >a:cdrive

where:

- > after the /V parameter is the DOS redirection operator.
- a: is the drive where you want the output placed.
- cdrive is the file name of the output file.

The following produces a status report for the C drive and lists the file names in the PROGRAMS subdirectory that contain non-contiguous areas.

C>\PROGRAMS\chkdsk *.*

If files were found to contain non-contiguous areas, CHKDSK would list them and display the following messages:

C. \PROGRAMS\CPROG1

Contains 2 non-contiguous blocks

C>\PROGRAMS\CPROG2

Contains 2 non-contiguous blocks

C> \PROGRAMS\CDAT1

Contains 3 non-contiguous blocks

Summary

Use CHKDSK often. It not only provides useful information about your environment and disk utilization but can help you avoid any unpleasant surprises. One final note. When using CHKDSK on a system disk, make sure it is the CHKDSK that goes with that version of DOS. ■

Virus continued from page 15.

- A new Macintosh virus has been reported in Australia. It is called Virus X, and every time you restart your MAC, it deletes a file, going backwards in numerical order. Recommended procedure for finding out if you have the virus is to create a file called something like "z," and then reboot. If the file is gone, you've got the virus.
- The Fish virus (PC) is due to activate this year. It is supposed to display the message: FISH VIRUS #^ - EACH DIFF - BONN 2/90 '~knzyvo}'. After the message is displayed, the machine halts.
- Fridrik Skulason (frisk@rhi.hi.is) the author of F-PROT posted this message to VIRUS-L on Thu, 31 Jan 91 09:29:14 under the subject: New viruses (PC):

Well, folks - we now have around 400 PC viruses - currently we get on the average one new virus per day, and the rate is increasing...maybe we will have 1000 before the end of the year.

Anyhow - for users of F-PROT 1.14 - please add the following encrypted signatures to the SIGN.TXT, to provide detection of the viruses I have received since Jan 15th. [If you want a machine-readable copy of these signatures, contact Claudia Lynch in the Computing Center (AS04@UNTVM1) 565-2324.]

- Hybrid iglMWj8jKMNAUHcZbj2AgYSdg9nmFsp7Ueys-pc3-ha7lv
- Akuku 3Ux5pMu5858HMj5MgXdA19n8x4ybN5YtMmk6PpykupSZ6
- SVC3.1 3Hxnv5u5uM749Lydm-SnY4PoYnOwlt7V5fUuMFxBWfZa9j
- Paris iH15v5umAmruKeV504HK8eIKjrG8wEEJT5m2M5DsdwO+UO
- Doom2 zU1MCmKMA5m8UVPmT5Xpp3cMgB7jUE0MTmURMVc5zv5nOk
- Wolfman ZUo5pjKmujaA5fwOvjMMx108fifY55pip5JWdwxdDU1eA7
- MIX2 zw1NW58mAjwH4AuFV51m6AtQlj5j62fXXjXfujf8gQelB
- 403 zHTkvju5AmvVgbs8Jl75nmwlrKxNc5N5gbED3mk5GKIYYn
- ACAD-2576 3g6jpmKMAma62XAcz5hkFSwRqqUNd0m5HNimvOSWGrAHYb
- Ontario ZIHJnWM-MimyuCuAwkj-28UnjxYjLwMEWm1vRqKqE47UYK
- Leprosy iHNpjKmuoXO8rHxotuxiWmtHW5mK4bD51CMK4Em5nCG
- Perfume-731 Zwbjvju585fhqt5jmm7YpyNufwmMWj1jhfOfM53cOrnNYW
- Spyer ZgJnC58Mu508JVTjTmEmih4YV+vPmo74O810TMkjYd3tFW
- USSR-1594 iUCTpmSMzmUkiMt26N5MURjKz7jaVpT8thP0bjfZcqbLHQ
- Sentinel zHJkpM8mum4YIPgBEPjMNMfPgBRsB5NmauFwe6At5j+8ol
- Monsta-B zHbmjvujKMSKWaQTjjWdfBe4Nb5uQg35XiMNWtMvSdIsbE
- Xmas Viol 3HRmvjuMAjnN4saOj5m8BhgDStp5MMFPUD6i9UBHDhTVHV

Interested in Joining a Ventura Publisher User Group?

There has been some interest expressed in starting a Ventura Publisher User Group on campus. If you are interested, please contact Claudia Lynch in the Computing Center [ISB 119 Phone: 565-2324 FAX: 565-4060 BITNET: AS04@UNTVM1]. ■

Speakers for AppleSEED Sought

Hypercard 2.0 is the topic for the AppleSEED April meeting. Suggestions of candidates for speakers on this topic are being sought. If you or someone you know might be qualified to speak on Hypercard 2.0, please contact Dr. Leo Newland at TCU (817-921-7271). ■

VAXCLUSTER USAGE STATISTICS

January Top Ten Programs: CPU Time Used

Program	Description	CPU Time	Percent of Total
1. User programs	Compiled Programs	15 05:37:07.13	68.9
2. DISKEEPER	Disk Optimizer	1 17:57:29.18	7.9
3. NEWS	ANU News Utility	1 05:28:17.18	5.6
4. CLUSTR	GIS Image Processing	0 19:40:07.16	3.7
5. NNTP_TCPWIN	News Transfer Utility	0 09:06:06.65	1.7
6. BACKUP	Disk Backups	0 08:19:33.34	1.6
7. MAIL SERVER	VMS Mail Server	0 06:15:13.89	1.2
8. MAIL	VMS Mail	0 05:10:19.56	1.0
9. LOGINOUT	User login	0 04:35:31.94	0.9
10. ERDM	GIS Image Processing	0 03:22:43.35	0.6
Total		22 02:52:08.30	

January Top Ten Programs: Frequency of Runs

Program	Description	Number of Runs	Percent of Total
1. LOGINOUT	User login	73541	19.9
2. SET	VMS Utility	51734	14.0
3. User programs	Compiled Programs	41288	11.2
4. DIRECTORY	VMS Utility	34611	9.4
5. DELETE	VMS Utility	28239	7.6
6. SEND	BITNET message Utility	19348	5.2
7. MAIL SERVER	VMS Mail Server	18482	5.0
8. SYSLOGIN	User Login	10956	3.0
9. MAIL	VMS Mail Utility	8888	2.4
10. TYPE	VMS Utility	8091	2.2
Total		369789	

Department to Host National Conference

The Department of Computer Education and Cognitive Systems (CECS) here at UNT will host the National Educational Computing Conference (NECC) in Dallas in June of 1992. UNT has hosted two other NECC conferences, in 1981 and 1988.

According to an article in the College of Education newsletter, *NewsNotes* (October 1990), the '92 conference is going to be especially good because the Texas Computer Educator's Association (TCEA) has chosen to forego their annual conference in order to meet in conjunction with NECC.

Over 3,000 registrants are expected at the 1992 conference, which is the 13th for the NECC. Additionally, more than 150 companies are expected to exhibit their most advanced hardware and software.

Opportunities for participation in the conference include paper and project presentations, panel discussions and various workshops. For more information, contact Dr. Cathleen Norris, conference chairperson, at CECS (565-3790). ■

The Best of the BBS



Edited by Mark Thacker, VAX Programmer/Operator (Mark@UNTVAX)

Welcome to the **Best of the BBS** column. This column highlights some of the more interesting and useful discussions on the UNT BBS. For those of you not familiar with the BBS, here is how to log into the UNT BBS.

- Sign-on by typing **CALL DEC** at the LAN prompt and then entering **BBS** as your Username at the VAX prompt.
- If you are already logged-on to the VAXcluster, type **BBS** at the \$ prompt.

The opinions expressed in this column do not necessarily reflect the views of Academic Computing Services or the Computing Center. Also, information in **Best of the BBS** has not been checked for accuracy.

Pascal for the Amiga

#1238 13-JAN-1991 11:56:24.54

Subject : Pascal for the Amiga

Are there any good PD/shareware versions of Pascal available for the Amiga? In the absence of one, I would appreciate opinions on the relative values of the various commercial ones available.

#1265 Reply to #1238 14-JAN-1991 12:43:54.75

Subject : RE: Pascal for the Amiga

Hi again Mark, I think that the best place to ftp Fred Fish disks from is isca.icaen.uiowa.edu. I don't know for sure that this is correct because I haven't been able to ftp to it today (or

anywhere else outside of campus for that matter) I guess there is some problem now. I don't know if this is an anonymous ftp site or an archive site. If it is an archive site you might have to have the files mailed to you, strip and concatenate them, uudecode them then un-zoo them. Of course try anonymous ftp first. I hope that I helped.

Disk Errors on Amigas

#1445 24-JAN-1991 17:57:55.85

Subject : read/write error

What's the best/easiest way to recover textfiles from a disk with a read/write error?

Mark

.....
#1449 Reply to #1445 24-JAN-1991 19:52:37.34

Subject : RE: read/write error

Hi Mark, Diskdoctor always has worked for me. I hear that DiskSalv is better but I have never had a disk that would not come back with Diskdoctor so I've never given it a try. I usually do a backup of the disk with Marauder II first. This makes a copy of the disk with errors and all and then run Diskdoctor on the copy so if worse comes to worse I can go back to the original disk and read it with a sector editor.

You might try warping all of the tracks except the track that contains the error and then unwarping and Diskdoctoring this if nothing else works.

BBS Sysops and GTE

#979 30-DEC-1990 06:29:46.51

Subject : Sysops in GTE area might be subject to Business telco rates

This may or may not impact local BBS Sysops, but I ran across the following message in a usenet news group, [comp.dcom.telecom].

The text of the message pretty much says it all. A minor point: this article refers to GTE, the local carrier in Den-

ton is GTE Southwest. I'm not sure what the connection is as far as policies like charging business rates for residential BBSs.

At any rate (pun intended), this may end up having no significance to local Sysops... it may just be a inflammatory cross-cross posting on Usenet. Caveat emptor.

The following cross-posted information is extracted from alt.cosuard. Can anyone in Indiana or a closely neighboring state provide any details on this?

From: BILL BLOMGREN -
Sysop: St. Pete Programmers Exchange RIME: PETEX

Well ... thought I would pass this tidbit of bad news along ... GTE Indiana prevailed against the BBS systems there ... ALL BBS's in GTE's area there are now at BUSINESS RATES. Which means \$50 per month base rates, plus MUCH higher long distance charges. Indiana Bell ... has filed the same tariff with the PUC (Public Utilities Commission) there, making it state wide.

Needless to say, GTE has a history of going after the little guy, so you can expect it here in the REAL near future! I expect it nation-wide in the near future. In Indiana, they decided that THE PHONE COMPANY can decide that your residence is a business, and charge high rates to all service incoming.

Unfortunately, the courts agreed with them.

Ain't Monopolies Nice???

Not a nice situation huh? We didn't need a precedent to be set like this ... now this paves the way for other companies to follow suit. It'll be interesting to watch the nodelist to see if the nets in Indiana (201 in Lafayette, 227 in South Bend, 230 in the Gary Area, 231 in Indy, 236 in Ft. Wayne/NE IN and 2230 in Terre Haute and 11/15 in Evansville) start shrinking.

Telix VT-102 emulation

#1246 13-JAN-1991 15:21:42.81

Subject : Telix

I just started using Telix and I've got a few probs. I'm using VTone-o-two emulation, (You see me none of my number keys produce a number. Let's fix that, then I'll go on.

.....
#1260 Reply to #1246 14-JAN-1991 10:03:30.10

Subject : RE: Telix

Try editing the keys using ALT K and loading the vt102 keys. Press display-Key and then the number keys one at a time. There should be no symbols appearing as you check the keys, if there are delete them using the Edit in ALT K. That SHOULD work, if not let me know! ■

VAX System News

New Version of JNET

JNET X3.5 was installed. This is a Beta release version of JNET 3.5. This version though, has appeared to fix the mainframe-VAX link connectivity problems we have previously been having. All the new features are documented in the file SYSSHELP:JNETX035.RELEASE_NOTES. BITNET performance should be slightly better on small files. Please report any unusual problems by sending MAIL to the OPERATOR account.

Paper Recycling

The University has started a recycling program. Initially, only white paper and computer paper will be recycled.

Recycling boxes are in the Administration Building, Music Building, and Willis Library. Gradually other campus buildings will be added. ■

COMPUTING TECHNICAL SERVICES

Mainframe Performance Statistics

Operating Systems Performance Statistics for January

CPU	SYSTEM	Planned Production Hours	Production Hours Achieved	System Uptime
ACAD	VM/XA2	744.00	734.58	98.7%
ACAD	MUSIC/SP	717.74	707.59	98.6%
ACAD	MVS/JES2	717.68	568.71	79.2%
ACAD	COMPLETA	711.19	561.81	79.0%
ADMN	MVS/JES2	744.00	743.35	99.9%
ADMN	COMPLETA	329.00	328.65	99.9%
ADMN	ADABASA	721.45	719.92	99.8%

- The ACAD CPU achieved 100% uptime in January.
- The HDS/7360 DASD achieved 100% uptime in January.
- The HDS/7380 DASD achieved 100% uptime in January.
- The ADMN CPU achieved 100% uptime in January.
- The HDS/7360 DASD achieved 100% uptime in January.
- The HDS/7380 DASD achieved 100% uptime in January.
- The EMC Solid State Disk achieved 92.4% uptime in January.

ACADemic (HDS) Program Hit Parade

January Top Ten Programs : Frequency Of Runs

Program	Description	#of Runs	% of Total
1. ADARUN	ADABAS Utility Module	9687	18.6
2. IEBGENER	IBM Utility	7658	14.7
3. IEWL	Linkage Editor	5582	10.7
4. PGM=*.DD	Compiled Program	5513	10.6
5. IEBPTPCH	IBM List Utility	3252	6.4
6. SASLPA	SAS	2491	4.8
7. IEFBR14	IBM Null Utility	2392	4.6
8. IGYCRCTL	VS COBOL2 Compiler	1927	3.7
9. SPSS	SPSS Version 4.0	1771	3.4
10. P02304	Natural	1693	3.3

January Top Ten Programs: CPU Seconds Used

Program	Description	CPU Seconds	% of Total
1. SASLPA	SAS	43829	34.3
2. PGM=*.DD	Compiled Program	33424	26.2
3. SPSS	SPSS Version 4.0	9657	7.6
4. COMPLET4	Academic COM-LETE	8561	6.7
5. ADARUN	ADABAS Utility Module	6367	5.0
6. SPCHLCOB	COBOL2 Report Writer	5756	4.5
7. SSS4001	Operations Automation	3221	2.5
8. BMDP2T	BMDP	2243	1.8
9. IEWL	Linkage Editor	1722	1.3
10. IF000	System Assembler	1636	1.3

Key Causes Of Lost Productivity In January: ACAD CPU

Miscellaneous

1. Extended software up-
grade of MVS/JES2.. 134.99 HOURS
 2. Scheduled software
upgrade of MVS/JES2. 26.37
 3. VM/XZ systems soft-
ware development. 6.81
 4. Emergency shutdown
ACAD system due to
partial failure of air
conditioning system
during spring regist-
ration. 3.53
 5. MVS/SP systems soft-
ware development. 2.26
 6. Auto restarts of VM/XA
system. 1.64
 7. Undetermined causes
for systems restarts. 0.82
- TOTAL 176.42 HOURS**

Key Causes Of Lost Productivity In January: ADMN CPU

Miscellaneous

1. Systems software
development. 0.73 HOURS
 2. DASD file maintenance
on ADABAS. 0.43
 3. ADABASA system
failure. 0.37
 1. COMPLETA system
failure. 0.35
- TOTAL 1.88 HOURS**

Disk Backup Schedules

SYSTEM	BACKUP	DESCRIPTION
Administrative MVS/SP	Daily	Monday - Friday around 7 p.m. (after COM-LETE is shut down) & on Saturday & Sunday if COM-LETE has been up that day.
	Weekly	Full pack dumps taken each Sunday morning.
	Monthly	Full pack dumps taken on the first day of each month.
Academic MVS/SP	Daily	Monday - Sunday during the early hours of the morning.
	Weekly	Full pack dumps taken each Sunday.
	Monthly	Full volume dumps taken on the first day of each month.
MUSIC/SP	Daily	Wednesday - Monday starting at 4 a.m. and lasting about 30 minutes.
	Weekly	Tuesday mornings at 3 a.m., these last about 2 hours.
	Semester	Once a semester, a permanent backup is taken.
VM/XA	VM Weekly	Early every Wednesday morning.
	CMS mini-disks	Daily backup performed early every morning. Weekly backup Wednesday starting at 3 a.m..
VAXcluster	Semester	Once a semester, a permanent backup is taken.
	Daily	Incremental backups are performed Monday -Thursday at 6 p.m.Saturday & Sunday at 5 p.m.
	Weekly	Full backups are performed every Friday beginning at 8 a.m. generally last all day.
	Monthly	A "stand alone" backup is performed monthly. Dates and times are given in the system log-on message.
	Semester	Once a semester, a permanent backup is taken.

Computing Center Short Course Registration Form

Please complete this form and return it AS SOON AS POSSIBLE if you wish to attend any of the short courses listed below. You may also register over the phone by calling (817) 565-2324. **FACULTY AND STUDENTS HAVE FIRST PRIORITY TO REGISTER FOR THESE CLASSES.**

NAME: _____ FACULTY ____ STAFF ____ STUDENT ____

DEPT: _____ UNDERGRADUATE ____ GRADUATE ____

PHONE: _____ MAILING ADDRESS: _____

SUPERVISOR SIGNATURE _____

I wish to attend:

- | | |
|--|---|
| • Introduction to IBM JCL (ISB 123):
____ Monday, February 25: 5:30-7:30 p.m. | • Intro. to Procomm+ (ISB 123):
____ Thursday, February 21: 2:00-3:00 p.m. |
| • Introduction to SPSS (ISB 123):
____ Wednesday, February 13: 1:00-4:00 p.m. | • Introduction to SAS (ISB 110):
____ Tuesday, February 12: 1:00-4:00 p.m. |
| • Intro. to the Internet & USENET (ISB 235)
____ Thursday, February 14: 3:00-5:00 p.m. | • Intro. to CUTCP/Telnet (ISB 235)
____ Monday, February 18: 3:00-5:00 p.m. |
| • Introduction to CMS (ISB 110):
____ Tuesday, February 26: 3:00-5:00 p.m. | • Introduction to Hypercard (ISB 6):
____ Tuesday, February 19: 1:00-3:30 p.m. |
| • Introduction to SPSS PC+ (ISB 110):
____ Wednesday, February 27: 2:00-5:00 p.m. | • Introduction to SAS PC (ISB 110):
____ Wednesday, February 20: 2:00-5:00 p.m. |

I would like to see more classes offered: _____ on weekends: _____ at night.

Comments:



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